

****EBAMA:****

****Event-Bound Autonomous Memory Architecture (EBAMA): A Zero-Search Paradigm for Knowledge Recall****

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Abstract

Modern computing systems rely on post hoc search, indexing, and inference to retrieve information, resulting in inefficiencies, contextual loss, and ambiguity. This paper introduces ****Event-Bound Autonomous Memory Architecture (EBAMA)****, a novel system paradigm in which autonomous digital agents are instantiated at the exact moment meaningful information is created. These agents persist independently, guarding the semantic context, origin, and location of the information. Retrieval is achieved through direct agent interaction rather than search or inference, enabling immediate and reliable recall. EBAMA represents a shift from retrieval-centric to memory-centric computing, aligning digital systems more closely with biological memory formation and offering new directions for operating systems, artificial intelligence, and human–computer interaction

1. Introduction

Information retrieval remains a foundational challenge in computing. Despite advances in databases, indexing systems, and artificial intelligence, modern systems continue to rely on searching large volumes of stored data after information has been created. This approach introduces latency, ambiguity, and reliance on probabilistic inference.

Human cognition follows a different model. Meaningful experiences are encoded at the moment they occur, enabling recall without exhaustive search. Inspired by this observation, this paper proposes ****Event-Bound Autonomous Memory Architecture (EBAMA)****, a system in which knowledge is captured at the moment of creation through persistent autonomous agents.

2. Core Concept

EBAMA is based on the principle that information likely to be needed in the future should have its memory instantiated at the moment it comes into existence. When a meaningful event occurs—such as the creation of a key, credential, or critical file—the system automatically generates a ****guardian agent****.

Each guardian agent is responsible for preserving the semantic meaning, temporal origin, and location of the information. Unlike traditional indexing systems, EBAMA does not store knowledge centrally. Instead, responsibility for knowledge is distributed across autonomous agents.

3. System Architecture

3.1 Event Detection Layer

The system monitors user actions and file system events, including file creation, modification, and explicit user signals indicating importance.

3.2 Semantic Filtering Layer

A semantic filter determines whether an event warrants the creation of an agent. This decision may be rule-based, user-defined, or assisted by machine learning models.

3.3 Guardian Agent Creation

When triggered, an autonomous agent is instantiated containing:

- * Information location
- * Time of creation
- * Semantic classification
- * Access permissions and lifetime rules

3.4 Agent Registry

A lightweight registry maintains references to active agents without storing their internal knowledge.

3.5 Query Resolution

User queries are resolved through direct communication with relevant agents. No global search, ranking, or inference is required.

4. Security and Privacy Considerations

EBAMA emphasizes user sovereignty and privacy. Guardian agents may be encrypted, permission-bound, and explicitly destroyed by the user. The absence of centralized knowledge storage reduces attack surfaces and mitigates large-scale data exposure risks.

5. Comparison to Human Memory

EBAMA mirrors several characteristics of biological memory:

- * Memory formation occurs at the time of experience
- * Recall is associative rather than search-based
- * Forgetting is selective and intentional

This alignment suggests EBAMA may provide a more natural foundation for intelligent systems than search-centric architectures.

6. Implications and Future Work

Potential applications of EBAMA include secure credential management, AI assistants with reliable memory recall, and operating systems designed around memory-first principles. Future work includes empirical evaluation, optimization of agent lifecycles, and integration with advanced reasoning systems.

7. Conclusion

Event-Bound Autonomous Memory Architecture proposes a fundamental shift from search-based information retrieval toward memory created at the moment of meaning. By assigning responsibility to autonomous agents at creation time, EBAMA enables immediate, reliable recall and introduces a new paradigm for intelligent system design.